U. S. NAVY MEDICINE

July 1980

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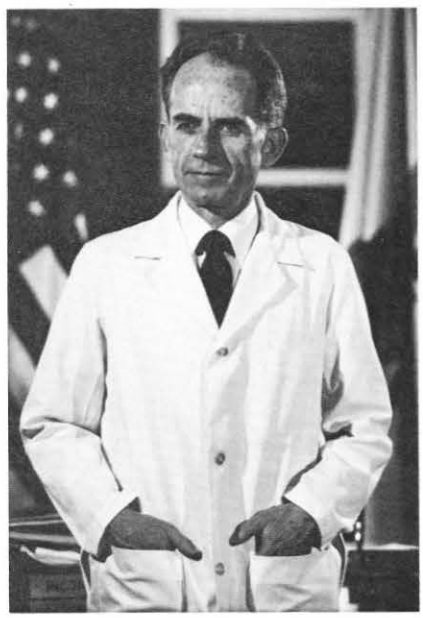
COVER: PFC Ray Chemanlt, USMC, rushes an ailing Cuban refugee to an emergency aid station at the Truman Annex, NAS Key West, FL. The woman was one of over 114,000 Cubans to arrive in the U.S. since the sealift began in April. Story on page 2. Photo by JOC James Jones, USN.

The Chief Petty Officer

There is a very basic principle of good management which states that "effective supervision requires that managers supplement objective methods of supervision with direct personal contact." There is also an old saying in the military that "an organization performs well those things that the 'old man' checks personally."

We all know that the commanding officer, although responsible, cannot possibly maintain direct contact with all people or check all things all the time. That is why middle managers are assigned to assist in supervising and directing employees. Middle management is best represented in the Navy by the chief petty officer community.

During my tenure as Surgeon General, I have been particularly impressed with the caliber of chief petty officers in the Navy Medical Department. They represent a cadre of talented, dedicated, and experienced men and women who are willing and able to provide middle management and first line supervision for the Medical Department. I have continually stressed the importance of proper utilization of our senior petty officers and, in particular, chief petty officers in positions of leadership for our junior personnel. Their experience, professionalism, and ability to relate to our corpsmen place them in a position few of us enjoy. They are the ones

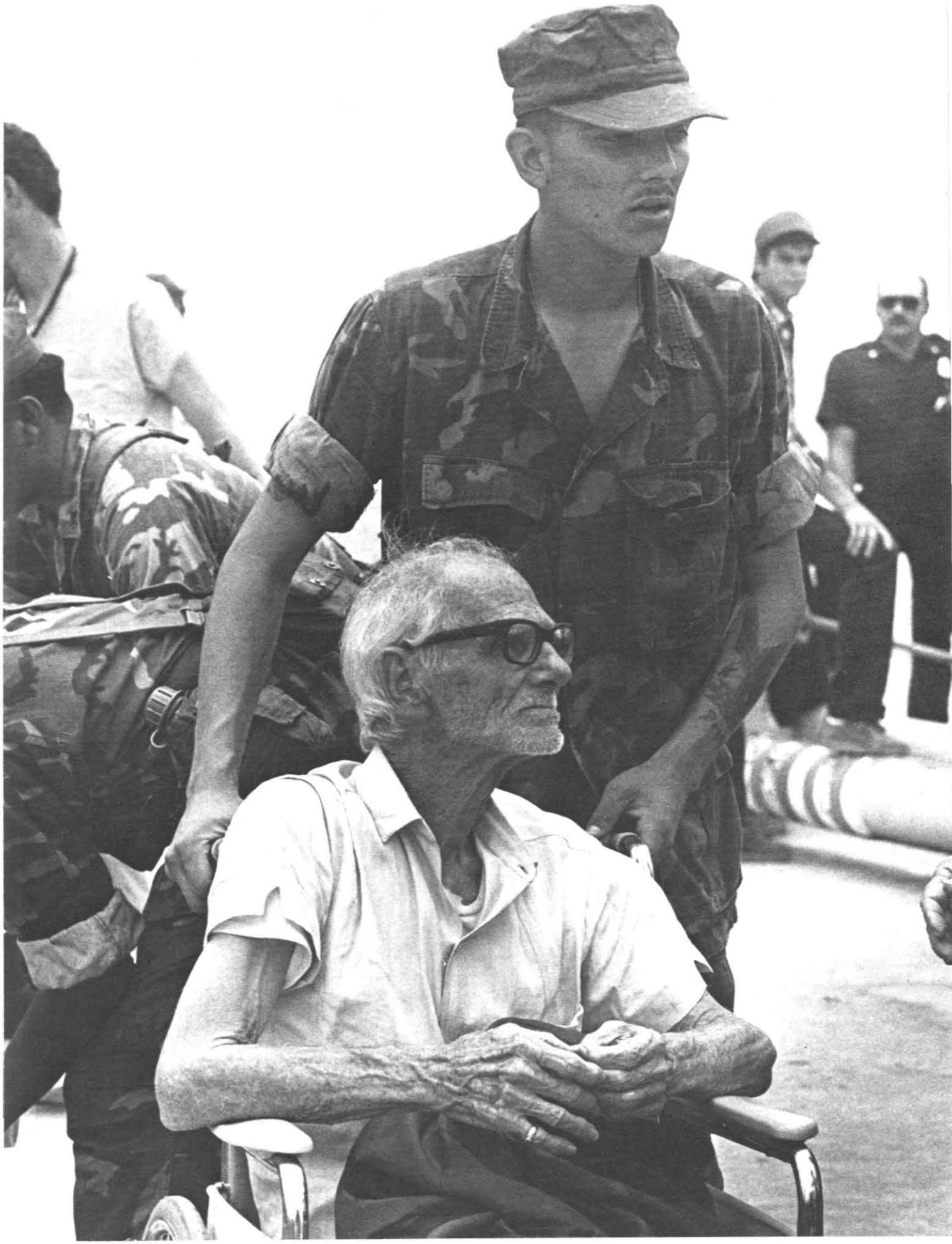


best able to provide the direct personal contact required in today's complex health care environment.

I believe we would all agree that the abundance of testimony concerning the effect of pay on retention of our talented personnel is true; however, pay alone will not stop our exodus of talent. There is also considerable litany placing equal blame on a lack of leadership at all levels. Failure to recognize and utilize the leadership talents of our chief petty officers is a luxury we cannot afford. In our zeal to pursue a bent for scientific investigation, managerial improvement, and other programs, we must remain acutely aware that it is our people who sustain us. Commanding officers must make a personal commitment to utilize their chief petty officers to their full potential and for the overall good of the command by keeping them fully informed and utilizing them in positions of leadership and responsibility.

During my travels, I have spoken to many chief petty officers and have made a personal commitment to speak to each group of chief petty officers who attend the Health Resources Management Course at the Naval School of Health Sciences, because I learn from them and I respect their abilities. As leaders, they possess rational minds coupled with an absolute faith in our mission, which makes them relentless and willful, sensitive and decisive, but seldom impulsive. They have the inner discipline to lead our enlisted personnel, inspire our officers, and contribute immensely to our mission. Give them the chance and I am confident that you will be impressed with their dedication and humbled by their self-assurance as I have been.

W.P. ARENTZEN
Vice Admiral, Medical Corps
United States Navy



Freedom Flotilla

Innovation, long hours, teamwork: those were the ingredients used by the staff of Key West's Naval Regional Medical Clinic to provide medical care to incoming Cuban refugees early in the evacuation operation.

Until about 40 medical personnel —doctors, nurses, and corpsmen— from Navy medical centers nationwide arrived to help, the small clinic under the command of LCDR Paul E. Daniel had almost sole responsibility for first contact medical care to arriving refugees.

Many of the clinic's personnel worked in excess of 24 hours without rest, treating everything from coronary problems to sunburns. They worked closely with a group of Cuban-American medical volunteers who provided invaluable initial support to refugees at the pier.

Now that the additional Navy medical personnel have arrived, they have joined those already working, and together the unit has established evaluation and treatment procedures.

At the Trumbo Point Annex, NAS Key West, the group converted a portion of a former seaplane hangar into a fully operational clinic. Surgical lights were set up, makeshift examining tables brought in with sheets used as partitions. A scrubbing sink was installed by linking up garden hoses to the limited water supply.

But the hangar is just one of four sites set up as treatment and evaluation centers for the refugees. Incoming Cubans are first medically screened pierside at the Truman Annex Naval Station, Key West, by medical personnel. Those who are seriously ill or injured are provided initial medical care immediately. There are also two smaller satellite screening and treatment centers, one in the old administration building at the Naval Station and a second in a security compound near the hangar.

The four sites are manned around the clock. Shifts are eight hours long but medical team members often work double shifts when needed, especially when large numbers of boats arrive pierside at one time. Nearly 1,200 patients were treated during one 24-hour period. The most common medical problems seen thus far have been dehydration, nausea and vomiting, and minor respiratory problems. Two cases of leprosy have been detected. These two patients were flown immediately to Carrville, LA, for further treatment.

To date, more than 114,000 Cubans have entered the United States. More than 13,000 have been treated by medical personnel on duty at Key West and of those, only

Photo by PHC John Francavillo

Opposite: PFC Douglas Aragon, USMC, assists an elderly arrival. Aragon is one of 50 interpreters on hand at Key West. Above: More than 700 refugees are crammed aboard the freighter Dr. Daniels *as it docks at Truman Annex Naval Station, where the Cubans begin the first stage of processing into the United States.*

LT Carmen Maldonado examines a new arrival. All refugees are screened prior to their release to family members or before transfer to other processing centers.

46 have required immediate hospitalization. LCDR Daniel said "We have treated everything from athlete's foot to coronary problems and, contrary to some reports, the overall condition of the refugees is very good." LCDR Daniel emphasized that one of the more important jobs of the medical support team is to identify refugees with medical problems to insure that they receive proper medical treatment at future relocation centers.

But the medical personnel in Key West have been providing more than just medical treatment. At times, all the refugees have needed is kindness. Over 90 percent of the medical personnel brought to Key West for the evacuation operation speak Spanish fluently and are able to listen to and understand the refugees.

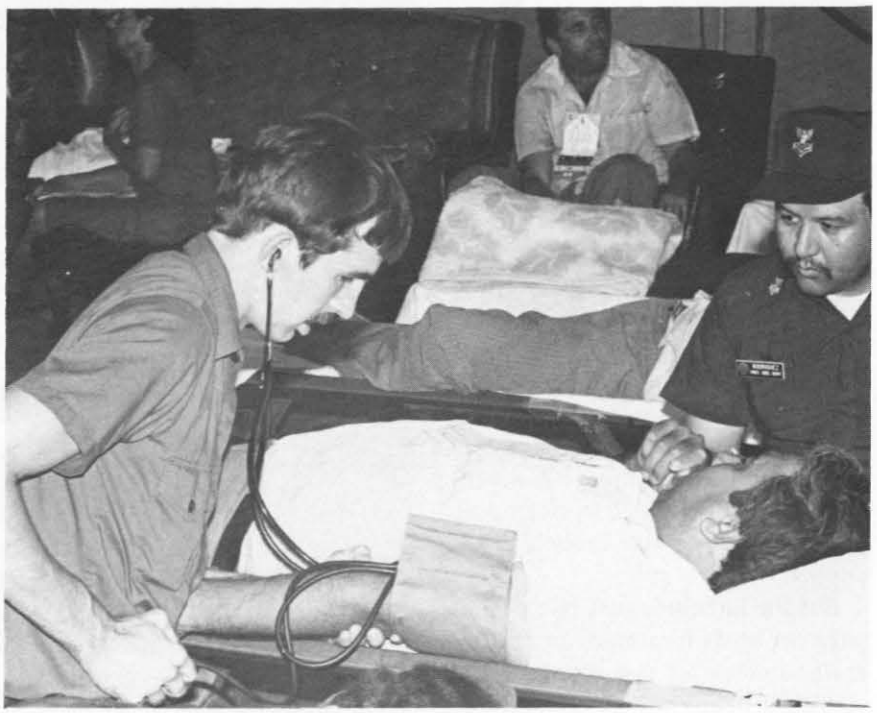
The people who are staffing the four sites come from all parts of the United States and, according to LCDR Daniel, they all agree on one point, "They are glad they're here and doing their share."

—Story by LCDR Mark D. Neuhart, USN and ENS Sue Wehrman, USNR □

Photo by JOC James Jones

HMC David Kruger, assigned to NRMC Corpus Christi, TX, is one of many Navy medical personnel providing medical care to the Cubans.

Photo by JOC James Jones



A refugee explains his symptoms to HM1 Luis Navarro during a medical interview in the Trumbo Point Cuban Refugee Center.

The Mission: Save Lives and Insure Maritime Safety

Historically, the Navy and Marine Corps team has been put to the test, playing a major part in contingencies and other events that have kept our nation free. During the recent humanitarian evacuation of Cuban refugees from Mariel Bay, Cuba, to Key West, FL, President Carter called for the Navy and Marine Corps to provide assistance to the U.S. Coast Guard. Ashore, the Navy quickly established, in conjunction with the Federal Emergency Management Agency (FEMA) and other state and federal agencies, a processing and support facility for the Cuban refugees at a former seaplane hangar at Trumbo Point Annex of the Naval Air Station, Key West.

After President Carter declared a state of emergency in Southern Florida, on 3 May 1980, 770 Marines of the 1st Battalion, 8th Marine Regiment, 2nd Marine Division, Camp Lejeune, NC, under the command of LCOL James R. McElroy, Jr., were airlifted to Trumbo Point Annex to relieve the Florida National Guard at the hangar processing facility. The Marines were assigned to provide security and assist local and federal officials in the processing operation. Forty additional Navy medical personnel—doctors, physicians, and corpsmen—were directed to Key West to augment the existing medical staff.

On 2 May 1980, ADM Harry D. Train II, Commander-in-Chief, Atlantic Fleet, directed USS *Saipan* (LHA-2) and USS *Boulder* (LST-1190) to proceed to the Florida Straits to augment existing Coast Guard assets in the search and rescue operation. Their mission was to save human lives and insure maritime safety during the unprecedented emergency caused by the flood of refugees leaving Cuba. They were to provide direct assistance if a vessel was in danger of sinking or having mechanical trouble during the transit to Key West.

Four hundred twenty-seven Marines and their supporting units assisting in the operation were embarked on board *Saipan* and *Boulder.* They include: Marine Medium Helicopter Squadron 261, Marine Corps Air Station Helicopter, New River, NC, 2nd Marine Aircraft Wing; "B" Company, 1st Battalion, 6th Marines, 2nd Marine Division, Camp Lejeune, NC, and elements of the 2nd Force Service Support Group, Camp Lejeune. Six Marine F-4s from VMFA 312 at MCAS Beaufort, SC, were assigned to NAS Key West in support of the operation.

Navy units embarked aboard USS *Saipan* and USS *Boulder* include Navy Beach Group Two, Detachment Delta, Beachmaster Unit Detachment Two, Assault Craft Detachment Two, and an Underwater Demolition Team, all based in Little Creek, VA. Composite Helicopter Squadron 16 from Pensacola, FL, provided additional air support.

Two Norfolk-based amphibious ships, USS *Ponce* (LPD-15) and USS *Saginaw* (LST-1188) have been designated to relieve *Saipan* and *Boulder* on station. In addition, three ocean minesweepers, USS *Illusive,* USS *Fidelity,* and USS *Leader* are also supporting the U.S. Coast Guard in the sea rescue and maritime safety operation.

Since the beginning of the boatlift in mid-April, more than 114,000 refugees have been processed in Key West. While operating in the Florida Straits, Naval Ships are under the tactical command of RADM Benedict L. Stabile, Commandant, Seventh Coast Guard District, Miami, FL.

The Federal Emergency Management Agency (FEMA) has the responsibility for overall supervision of the operation ashore. The operational commander coordinating DOD support is RADM Thomas H. Replogle, Commander, Caribbean Contingency Joint Task Force (CCCJTF) in Key West, FL. The present on-scene commander on board USS *Saipan* is RADM Warren C. Hamm, Jr., Commander, Amphibious Group Two. CAPT W. Ivan Lewis, Commanding Officer, NAS Key West is operating the hangar processing facility as the executive agent for CCCJTF.

During the Cuba to Key West "Freedom Flotilla," Navy and Marine teams were ready and responded to the challenge, insuring protection and security for those seeking a new future in this country.

From Manila to Norfolk

Born in Manila, the Philippines, during World War II, Marcelino R. Villaflor is best known as "Doc" to the 45 men assigned to the Navy's Fleet Tug USS *Papago* (ATF-160) homeported in Norfolk, VA. Villaflor is the only medical representative attached to the ship. "It's a challenging job and a great experience," said the 40-year-old First Class Hospital Corpsman.

He has to be a jack of all trades in the medical profession. "When we're at sea, I'm it. I have to make a diagnosis and treat any life-threatening situations (illness or injury) that happen," he said.

The ship's small medical office is well equipped with every inch of space accounted for. "I have a full surgical kit, sterilizer, library of reference books, medical supplies, and even a microscope for doing lab work," he continued. "I can even do some dental work if need be." When the ship goes into dry dock for overhaul later this year, he is planning to have a fold-away surgical table installed for doing examinations.

"I hold sick call about three times a day," Villaflor said. The average workload is about two or three patients a day. During April, he treated a total of 50 people.

"Mostly, I handle emergencies like sewing up lacerations, setting and splinting broken bones." Removing ingrown toenails, doing blood work (counts and types) for infection, and treating colds and flu are some of his other specialties. "I even had to pump a guy's stomach once," Villaflor added. He also serves as the ship's Health and Safety Officer, and one important aspect of this job is testing the ship's fresh water supply.

Papago's corpsman is also the collateral spiritual and emotional "Doc." "If people have mental or family problems they come to me," he said. "Sometimes it's good for a man just to have someone to talk with." Being a lay Eucharistic minister in the Catholic Church, Villaflor has some extra experience in counseling.

Villaflor hasn't always been a corpsman. "When I joined the Navy in 1962, the only thing a Filipino could be was a steward," he said. Stewards acted as cooks, wardroom attendants, and housekeepers for officers aboard ship, bachelor officer quarters ashore, and were assigned to the personal staffs of senior flag officers and officers in command. In the mid-70s, the rate was combined with the commissaryman (cook) rating to become the Mess Management Specialists rating. Many of the steward rate duties have been dropped from the new rating.

"In 1972, the Chief of Naval Operations said it was unfair for Filipinos to serve only as stewards and he opened up other ratings to us," said Villaflor. First, Villaflor took the Navy-wide rating examination to become a disbursing clerk. "I failed it badly," he continued. "So, I then applied for corpsman school."

Villaflor studied hard in corps school and graduated near the top of his class. He has since completed the Independent Duty Corpsman School at Portsmouth Naval Hos-

JO1 Rich Beth

HM1 Villaflor does a bacteria test of the ship's fresh water supply.

pital. As a result of the more advanced school, he earned an associate in science degree from George Washington University, Washington, DC, in 1976. "I had to take extra college courses at night," he said, "but, it was worth it."

As a steward, it had taken him seven years to make third class. Since becoming a corpsman, he made second and first class each on the first try.

Even though Villaflor became a naturalized U.S. citizen in 1972, he has never lost touch with his homeland. "I am currently serving as the President of the Philippine American Community of Tidewater (PACT)," he said. PACT, an organization of 150 members, was founded in 1971 to help change the public's perception of Filipino immigrants. Since its beginning, the organization has grown to include many services and projects.

"Some of our main goals are to highlight our people here, back home, and give aid to new families just arriving in the area, especially servicemen who marry girls in the Philippines and aren't sure how to get them over here or how to help them adjust once they are here." PACT works through and with the Navy Family Services on many of these cases.

Another project of the organization is a mobile clinic used to treat migrant farm workers during the summer months. "It's staffed by Filipino doctors and we don't charge for the services," Villaflor added. "When the ship is in port, I try to get out and work with the clinic one weekend a month."

A father of four, Villaflor made a special request to stay aboard the *Papago* for an additional year. "I like the ship and the people and I feel like I'm accomplishing something."

—Photos and story by JO1 Rich Beth,USN

BUMED SITREP

CHAMPUS PAYMENT LEVELS MAY INCREASE

A change in the method used by the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) to determine allowable medical charges was announced by Theodore Wood, Director of the Office of CHAMPUS. The change will improve the overall level of payments for CHAMPUS claims and is expected to result in an additional $13 million paid on CHAMPUS claims for medical services.

Previously, the doctor's "customary charge" was one of three factors used in determining the allowable charge on a given claim. Under the new method, the allowable charge will be based on the lower of two factors, the actual bill or the prevailing charge for the service performed in that geographical area.

CHAMPUS officials believed that the elimination of the doctor's "customary charge" will narrow or remove the gap between a billed charge and the allowable charge, thus increasing doctor participation in the CHAMPUS program.

FAILURE IN HAVING A MEDICAL RECORD ADMINISTRATOR AT MEDICAL FACILITIES

Several facilities surveyed by the Joint Commission on Accreditation of Hospitals (JCAH) have been cited for failure to have a qualified medical record administrator on at least a part-time basis, or failure to secure the regular services of a qualified medical record consultant. As a qualified military registrar, the patient affairs officer satisfies this requirement. The shortfall in this area is the failure of those at the command to explain this to field representatives during the survey. In preparation for the survey, when completing question #38 of the Medical Record Services chapter of the Hospital Survey Profile, indicate that the patient affairs officer acts as medical records administrator and is accountable to the commanding officer for the quality of medical records.

AUGUST 1980 NAVY AUGMENTATION BOARD

The Navy's Augmentation Board meets semi-annually in February and August. This Board meets to consider Naval Reserve and temporary officers for transfer to the Regular Navy. The next Navy Augmentation Board will convene on 19 Aug 1980. Navy Medical Department officers who would like to be considered by the August 1980 Board *must submit* their application to the Commander, Naval Military Personnel Command (NMPC-211) prior to 7 July 1980. Applications received subsequent to 7 July 1980 will be deferred to the next scheduled board (February 1981). BUPERSMAN Art. 1020120 provides more specific information regarding the augmentation application procedure.

Operational Medicine Aboard USS Java—1816

As the War of 1812 was drawing to a close in 1814, the 44-gun frigate USS *Java* neared completion in a Baltimore shipyard. Although too late to prove herself in combat with the British Navy, *Java*'s skipper, Oliver Hazard Perry, the recent hero of Lake Erie, was eager to get her to sea.

But eagerness and anticipation had to wait. The very effective British blockade of the U.S. coast had yet to be lifted and *Java* had not been fitted out or made seaworthy. Moreover, the vessel still needed a crew and a qualified medical officer.

Thomas V. Wiesenthal, Assistant Surgeon, U.S. Navy, would be *Java*'s physician. In April 1815, Wiesenthal eagerly reported aboard, one year after joining the Navy. His initiation to sea duty was anything but abrupt, for *Java* sat at her berth through August as she was rigged and her new spars adjusted.

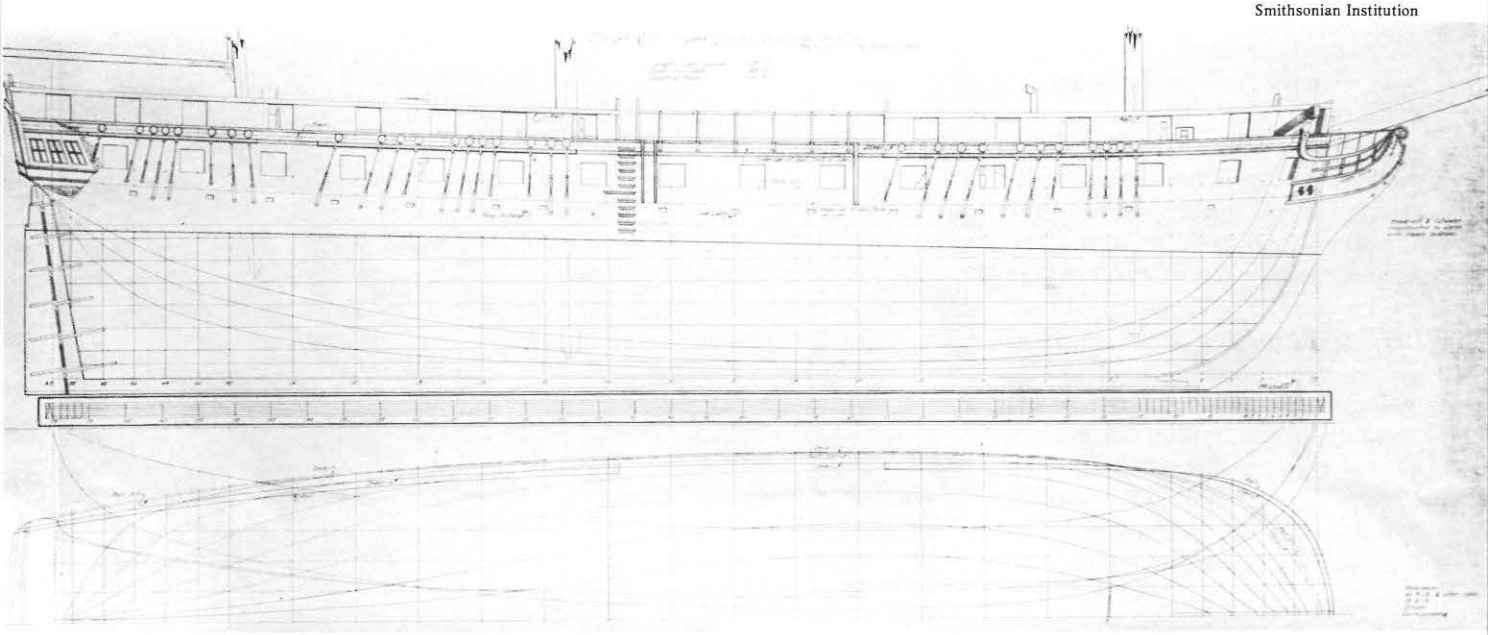
In late August and early September 1815, she began her sea trials in the Chesapeake Bay and Dr. Wiesenthal was content to treat a few cases of fever he identified as "Intermittents" and "Remittents." One case of "Low Nervous Fever" proved fatal, but he was able to control "Chronic Syphilitic cases and mercurial disease."

October saw the vessel in the New York Navy Yard for another change of rigging and, as the work dragged into the winter, disease began to take its toll. Wiesenthal was kept busy treating "Pleurisies, Pneumonic Typhus and Catarrhs . . . the Catarrhus Contagiasus or Influenza."

Another malady he called "Typhoid Pneumony" appeared with "a pain in the head and breast, with slight chills alternated by heats running through the system. The pulse was generally depressed . . . but the symptoms of local inflammation were always sufficient to induce me to bleed the patient . . . . Drastic purgatives I found highly detrimental, and never gave any purgative at all except a sufficiency . . . After bleeding an Emetic was given, and afterwards cooling diaphonetics, sinapisms [mustard plasters] to the feet, and blisters to the breast in order to divert the disease to the surface . . . Where a great degree of heat prevailed, I used vinegar and water, which by sponging the patient, served to affect in equalizing the excitement, and at the same time greatly added to the comfort of the patient."

Java's refitting lasted several months and, before it was completed, smallpox broke out in the

Smithsonian Institution



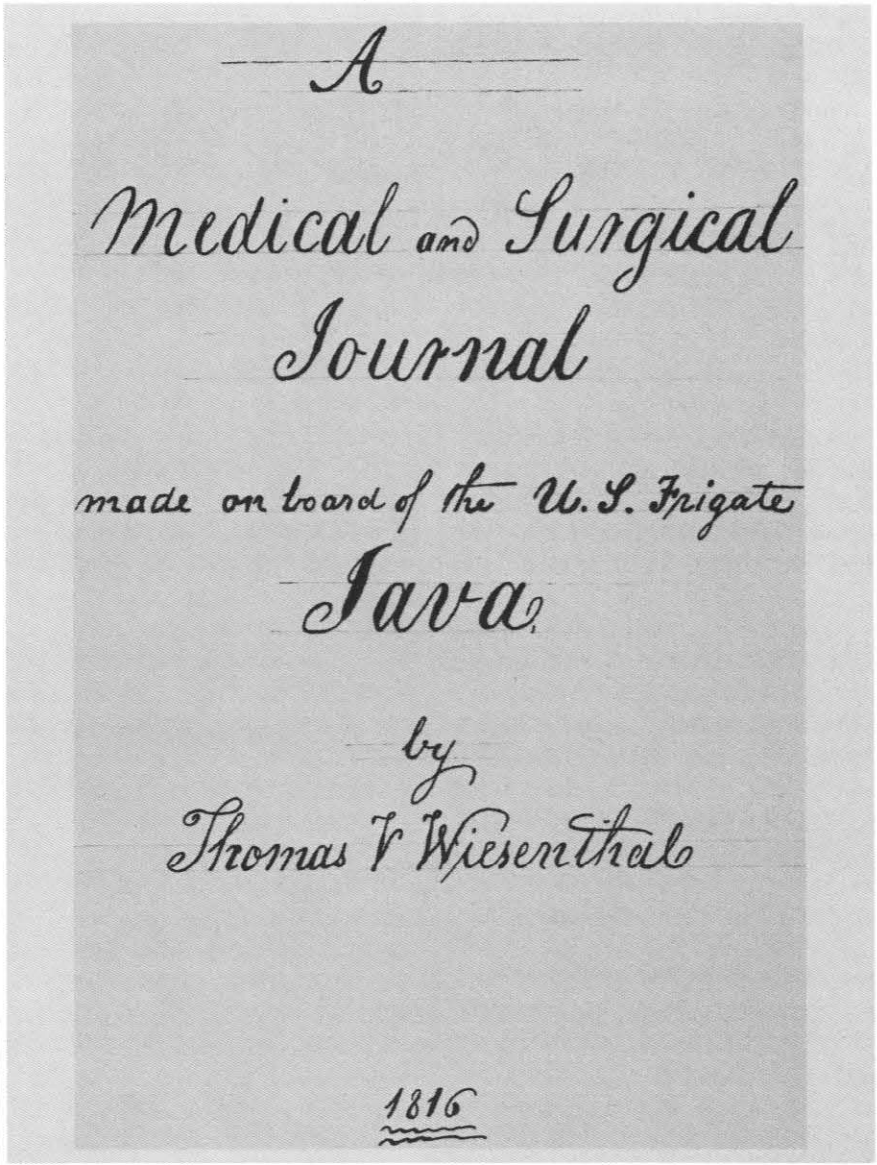
Hull plan of USS Java

neighboring community. Dr. Wiesenthal credited Jenner's vaccination with saving many of the crew. "In every instance where the matter [vaccine] was inserted, it took effect—and not one of those who were vaccinated took the small pox, or had the least symptom of it . . . ."

While in New York, *Java* finally got her orders. She would proceed to Newport to fill out her crew and then report to the Mediterranean.

On 22 Jan 1816, *Java* left Narragansett Bay for the open Atlantic in the teeth of a terrible storm. One of her new masts snapped like a wooden match, dumping 10 men to the deck below. Five were killed and five injured. The surgeon did what he could.

One of those he treated was an ordinary seaman, Francis Rodd, who had struck his knee on a deck fitting. "On the second day symptoms of tetanus set in . . . the jaws became much restricted in their motion, the lumbar and dorsal muscles violently rigid with pain in the head and high inflammatory symptoms . . . External applications of strong, Tincture Opii were used and warm fomentations from 8 o'clock PM to 4 AM which at 12 at night produced some rest . . . and relieved his pain. His skin now became very hot pulse full and quick with great thrust, the knee much inflamed sore to the touch but not much swollen, and the muscles appeared less under the influence of spasm than the day before. . . . wine was given freely as an antispasmodic, but this increased the fullness and frequency of the pulse so much that toast and water only was given; the skin was violently hot and the thirst disturbing. The rigidity of the dorsal muscles returned with an irritability of the stomach which rejected everything that was given. Fomentations to the knee of hot water were again applied, and flannels steeped in Tinc Opii applied to and kept on his breast and stomach which gave him some rest and reduction of pain. A suppuration now took place which surrounded the old injury, it was opened and discharged some pus—cataplasms [poultices] were then reapplied. The spasms continued with much less violence than in the commencement, the Tinc Opii and cold applications were again resorted to, which gave relief and the spasms continued to subside. An abscess soon formed itself in the underpart of the thigh and its sinus extended about six inches up the thigh, this was opened and discharged a great quantity of healthy pus. He now began gradually to recover his appetite and strength . . ."


A

Medical and Surgical

Journal

made on board of the U. S. Frigate

Java

by

Thomas T. Wiesenthal

1816

Title page of Assistant Surgeon Wiesenthal's journal.

Java arrived at Algiers in April, and Perry went ashore to persuade the dey of Algiers to honor a treaty he had been ignoring. With *Constellation, Erie,* and *Ontario, Java* then visited Tripoli. The troublesome Tripolitan pirates were suita-

bly impressed by the show of force and ceased to be threat to American shipping.

Other Mediterranean ports of call included Syracuse, Messina, Palermo, Tunis, Gibraltar, and Naples. Assistant Surgeon Wiesenthal kept busy treating dysentery, syphilis, gonorrhea, rheumatism, abscesses, contusions, jaundice, diarrhea, catarrh, pleurisy, fevers, and exotic maladies brought on by liberties in strange ports.

Wiesenthal was also *Java*'s dentist. He extracted what he had to and "saved" teeth with a cure he obtained from a Dr. John Buckler of Baltimore. He mixed one-sixth of a grain of "Argent Nitrat" [silver nitrate] with an undetermined amount of opium and formed a pill ". . . which being placed within the decay of the tooth very soon destroys the nerve, with but little pain and the tooth will no longer be troublesome—great care must be used in placing it in the tooth as it will otherwise corrode the skin of the mouth."

Late summer added to the sick list. Diarrhea and dysentery were particularly prevalent, due in part to the fact that the men found and devoured huge quantities of grapes which "tended greatly to augment the violence of these diseases, the dysenteries particularly."

The fall brought no respite. The variable weather brought on "catarrhal fevers" that weakened many of the crew. By the turn of the year, Wiesenthal was seeing an average of 33 patients a day. Remarkably, with the exception of the five men killed in the earlier, storm-related accident, only two of his patients succumbed to disease on the cruise, "one of Typhus" the other of "Phthisis Pulmonalis [tuberculosis]."

Java returned to Newport in 1817 and Dr. Wiesenthal left her service. He remained in the Navy until 1829, when he was dismissed.—JKH □

Psychiatrist Becomes White House Fellow

The purpose of the White House Fellowship program is to provide gifted and highly motivated young Americans with some firsthand experience in the process of governing the Nation and a sense of personal involvement in the leadership of the society.

The program seeks to draw exceptionally promising young people from all sectors of our national life—the professions, business, government, the arts, and the academic world. It is essential to the healthy functioning of our system that we have in the nongovernmental sector a generous supply of leaders who have an understanding—gained at firsthand—of the problems of national government. In a day when the individual feels increasingly remote from the centers of power and decision-making, such leaders can help their fellow citizens comprehend the process by which the Nation is governed. . . .

Dr. Rodriguez

Recently appointed to the 16th class of White House Fellows for 1980-81 was LCDR Alexander R. Rodriguez, MC, USN. Dr. Rodriguez, 35, is Director, Family Medical Health Clinic, NRMC Camp Pendleton, CA, and was one of 17 Fellows chosen from among 1,525 applicants and screened by 11 regional panels. The President's Commission on White House Fellowships interviewed 34 national finalists before recommending the 17 persons to the President.

As a White House Fellow, Dr. Rodriguez will spend a year working in a Cabinet-level agency, in the Executive Office of the President, or with the Vice President. He could serve as a special assistant, performing tasks for a Cabinet Secretary, the Vice President, an assistant to the President, or to appropriate under or deputy secretaries.

Dr. Rodriguez has previously served as Director of the Navy's Psychiatric Technician Program and as Chief of Psychiatry at the Naval Hospital, Guantanamo Bay, Cuba.

On Growing Children

The Roots of Adolescent Turmoil

CDR Eli Breger, MC, USNR

"The ripeness of adolescence is prodigal in pleasures, skittish and in need of a bridle." Plutarch

Adolescence is a developmental period characterized by erratic change following the earlier, relatively calm, adjusted, and balanced time of childhood. It is hallmarked by turbulence and disharmony within the adolescent and reinforced by similar processes in his peers. Dramatic and major changes occur on three levels of functioning—biologic, psychologic, and socioculturral. Each occurs at a different rate, out of harmony with one another and therefore bringing considerable stress to the young person. All instinctual drives are intensified and this, coupled with previously unresolved conflicts, produces a state of great upheaval most commonly referred to as adolescent turmoil. There is no choice as it cannot be bypassed; it is a vital and necessary period during which many tasks are to be accomplished as the youth voyages toward young adulthood.

Biological Level

Biologically there is the onset of puberty in response to a thrust of the endocrine glands. There are widespread physical changes of a general growing type and, more pointedly, a rapid development of sexual characteristics. Male or female hormones begin actively to secrete producing ova and sperm, making conception possible.

The growth occurs unevenly and in spurts, making it difficult for the adolescent to integrate any sense of new body image. The externally obvious and comparable physical changes vary from person to person and this leads to boastfulness and competition on the part of the haves, and feelings of inferiority and depression on the part of the have-nots.

Psychological Level

On a psychological level, we view a variety of behavioral manifestations, many of them quite discordant and turbulent, reflecting the underlying biologic thrust. We see a breakdown in adaptation as the power of instinct overwhelms the ability of the adolescent to adapt. This leads either to an active expression of the conflicts, often with inappropriate or antisocial behavior, or strenuous control and rigid suppression of the adolescent process itself.

Anxiety increases, often to the point of panic, and at times reaches a point where the youngster's ability to gauge reality is compromised. Preoccupation is frequent and mental energy is deflected inward, leading to declines in academic performance and hypochondriacal concerns with inner bodily processes. Self-centeredness, with its demand for immediate gratification, is common.

Aggressive drives increase, leading to the enhanced popularity of sports or, on the other hand, playing a role in anti-authoritarian and delinquent behavior.

Overflowing sexualized energy results in great restlessness. It can lead to healthy channeling into athletics or to undesirable transformation into impulsive and accident-prone behavior. Sexual strivings seek outlets which may be out of keeping with acceptable family standards. Early sexual involvement may emerge without an adequate emotional basis or readiness. Ensuing guilt and anxiety arises or excessive sexual repression develops and may continue into adulthood. With age and experience hopefully comes love, tenderness, and responsibility to be added to the physical drive seeking sexual discharge.

Contradictory feelings on all levels are prominent. Feelings of love-hate or independence-dependence add to the adolescent's feelings of turmoil. The fear of these feelings and their consequential actions is so strong, secretiveness from adults becomes marked, resulting in less communication.

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We do find previously strong and adaptable children managing this turmoil in relatively smooth and acceptable patterns. Despite declines in grades reflecting a massive deflection of mental energy away from studies, the adolescent's intellect may be increasing rapidly. There could be a widening of interests and growth in his ability to deal with abstract concepts. In spite of its chaos, adolescence is an age of idealism. There is a strong need for love and a need to identify with pure and unequivocal individuals and beliefs.

Developmental Tasks

Another approach to viewing the psychological changes in adolescence is to consider the stages of development that youth must deal with, often unknowingly, during their passage toward adulthood. Striving for independence is universal in virtually all species of living things and is markedly accelerated in the human adolescent. The goal is to separate and individuate in a mature manner, attaining the ability to relate to parents with relative equality and without fear of reverting to the way it was. In the process, a new sense of self emerges, is worked on, and refined. There is discomfort as the adolescent senses many parental patterns within himself. In his attempt to cast off these identifications, he may enhance his conflict with his parents. Ties with parents are diminished but strengthened with peers and often with adults other than parents. The conflict between youth and parents hopefully is worked out meaningfully; if not, it leads to distancing, rebelliousness, and alienation.

A second developmental task is the firm establishment of one's sexual identification and, as such, it represents the final touches on the past gradual process. Social pressures regarding sexual activity are many and conflictual; they are stimulating and repressing. Today's very open society with widespread sexual stimulation by the media confounds the process. Menstruation, masturbation, and ejaculation serve to establish a vital rhythm to sexual life but on a psychological level each may induce conflict in the individual.

Establishing an acceptable and workable moral code represents a third task of teenage life. It involves a refining of what had been a gradually developing process tied strongly to parental teachings and modeled after parental behavior. This process requires a reworking, a strengthening, and a flexibility of earlier principles to deal with a variety of new issues. As he works on this, a weaker adolescent may suffer severe breakdowns resulting in antisocial behavior and rebellion toward parents. Present cultural forces with their great inconsistencies in behavior and widely publicized unethical conduct intensify the conflict and difficulty for the adolescent who is attempting to effectively develop his own moral code.

As a fourth task, one should consider the establishment of realistic, meaningful, educational, and vocational goals. The process is complex involving conscious and unconscious factors and complicated by today's ever widening array of fields of endeavor. The teenager is influenced by his past educational experiences, the vocations of individuals with whom he has identified, and his innate personality tendencies and temperament. There are also issues of parental goals and aspirations for him as well as societal forces encouraging each generation to improve over that of its parents. Adolescents are threatened by the seeming irreversability of the decision and fear making a mistake. Life was so much simpler before when one worked toward the time one would make such decisions. It is in late high school or early college when we see school failure. It is characterized by apathy, inability to write papers, lack of commitment, decline in confidence, and often a departure from school for a time or forever.

Sociocultural Level

Adolescence proceeds on a sociocultural level as well and is deeply influenced by these forces. Ideally, a culture should enhance the passage into adulthood and help in the consolidation of the newly established personality. Unfortunately, this is not always the case. Although puberty is universal, sociocultural forces vary with culture and time. In general, the more primitive the culture the clearer the path. Unfolding biologic maturity is rewarded with enlarged privileges and recognition. Our own culture is inconsistent and discontinuous. Maturity occurs in a piecemeal manner and is often out of keeping with what the child is actually ready for.

Parents also change and grow in this process. They too have their passage from parents with adolescent children to parents with young adult children. Parental values are threatened and their anger is great and often tinged with envy because youth appear to have all the advantages without the responsibilities. The adolescent cannot help but stir up many unresolved conflicts within his parents. Such a conflict could be parents wishing their children to fulfill certain of their own unfulfilled dreams and expectations.

On a broader sociocultural level, features exist today somewhat unique to our times that fan the flames and retard stabilization. Peer groups have more power and a greater variety of life styles than ever before. Social change is very

rapid and a source of anxiety for all. The job market is also limited, requiring longer and longer educational preparation. Widespread drug usage with its rapid ability to temporarily alleviate conflict and tension appears to deprive the developing personality of a coping capacity which would normally develop if the drug option were not available.

The manifestations of adolescence and its turmoil are so varied and ill-defined at times, it is most difficult to diagnose what is passing instability and what is developing psychiatric illness. In truth, this can be ascertained with full confidence only in retrospect, when the interaction between the forces of turmoil on the one hand and personality structure on the other has been stabilized. Adolescent turmoil may be but a waystation on the long road of psychiatric illness begun in childhood and traveling its own persistent course toward the major mental illnesses of adulthood. However, where the ego has been strong and flexible, it withstands the onslaught of the process and safe passage into adulthood is accomplished by the vast majority of our adolescents.

"Don't laugh at a youth for his affectations; he is only trying on one face after another to find a face of his own." Smith □

Combat Casualty Care at Camp Bullis

Some 500 Army, Navy, and Air Force students and support personnel recently joined forces for a unique training experience. The Combat Casualty Care Course (C4), a pilot program held in and near San Antonio, TX, was designed to help prepare military doctors to handle combat and disaster medicine, especially in a total force environment. According to Air Force LCOL Earl Ferguson, C4 director for the second week, the course's goal is to prepare the military physician to function in the forwardmost point on a modern battlefield at which each service assigns physicians.

Did the prototype work? The answer is clearly, yes, according to just about everyone who took part in the first two courses held from 27 April to 10 May 1980. Comments from Marine and Army support personnel, students, and instructors representing all three services sounded like a recruiting commercial:

"What do you think of the course?"

"Long overdue." "Great." "Need more of it."

The more important question might be, Why was the course so successful? This answer lies in the joining of all the course components. "Possibly the best feature of the C4 is that it's a tri-service exercise," stated Air Force LCOL Richard C. Simmonds, and instructor in the surgical trauma aspects of the training. "For the first time," Simmonds explained, "physicians from all services realized each other's problems are real and not necessarily very different from their own."

Initially, a few of the physician-students minimized the need for training together, feeling they could learn as much in a service-unique atmosphere. However, most soon came to appreciate Air Force LCOL Randle Johnson's opinion, that it was a "rare opportunity to work as a total force." He is the chief of internal medicine at Wilford Hall in San Antonio and in charge of disaster training there.

Like Johnson, some of the students volunteered to attend the C4. The others were selected because they were in or slated for assignments to field operational medical units.

That means many of the 120 Army doctors could be working in evacuation and combat support hospitals. "They would be in or near the forward combat area," says COL James Van Straten, deputy superintendent of the Army's major medical training facility, the Academy of Health Sciences (AHS).

The 80 Navy physicians chosen for the first two casualty care courses will be in a similar position. Despite their singular sea-going image, according to CDR George Harris, course instructor and representative from the Health Science Education and Training Command, Navy doctors also serve in the jungles and deserts. They are the physicians for the Marines. Of course, Harris adds, each ship has its own medical crew for its 5,000 or so personnel. The ship's medical facilities are similar to a permanent clinic. "But when the Marine Corps goes to fight, they must take everything with them ashore," Harris says. "Everything" includes medical support.

Altogether, 40 Air Force physicians attended the initial C4s. According to Air Force MAJ Roland Carroll, officer in charge of one squad of physicians, they will be up near the front lines as Army and Navy physicians may be.

The Air Force doctors will probably be serving with aircraft evacuation units in the combat environ-

Photos courtesy U.S. Army

Physicians learn to load patients aboard a helicopter.

Triage and patient care exercise.

ment, says LCOL Ferguson.

All the students, Air Force, Army, and Navy, had at least one thing in common—by the end of the week's training they were "very tired." They experienced the extent and type of physical conditioning required in combat.

Along with many of their instructors, the C4 physicians ate, slept, and trained in the field at Camp Bullis. Their work hours? 0500-2330. During those 18½-hour work days, the military doctors renewed prior field experiences and were exposed to everything from caring for themselves in a field environment to cleaning out the wounds of chemically contaminated casualties and protecting themselves on the battlefield.

The emphasis was on doing. Seventy-five percent of the C4 was hands-on training rather than classroom lectures.

"The most beneficial aspect of being here was just that—being out here in the field," says Army CAPT Roger Michaud. Marine "patients" moaned and groaned and heavy trucks rumbled in the background as he talked. "I've enjoyed it. I've learned about teamwork, cooperation, and communication under stress."

The designers of the course, in a joint venture among the Uniformed Services University School of Medicine, AHS, and a tri-service curriculum committee, realized that the kind of learning Michaud talks about can't be gleaned from even the best didactic training.

The actual field work consisted of both medical and military training. The Army's 507th Medical Company from Fort Sam Houston provided aircraft and personnel for helicopter evacuation. Treating patients on litters in the air was yet another exercise new to the C4 students.

At Camp Bullis, such medical disaster exercises as bandaging, splinting, litter-carrying, and ambulance-and helicopter-loading acquainted the professionals with what the enlisted medic has to do. It also prepared them to supervise and perform that medic's job when necessary.

The Army Academy of Health Sciences at Fort Sam Houston and the School of Aerospace Medicine at Brooks Air Force Base also provided sites for medical training. There, the treatment of projectile wounds and chemically contaminated casualties exposed the physicians to medical problems peculiar to a combat situation. Several students considered the exposure to nuclear and chemical training at Brooks the most important part of the C4.

Because many of the students went into the service hospitals directly from medical school, most of them didn't have an appreciation for living in the field. So, one of the purposes of the C4, says course director Army LCOL Barry Wolcott, "is to teach them the socialization aspects of working in the field." In addition to medically-oriented exercises, there was practice in donning gas masks and other protective gear, and eating field rations.

One of the highlights of the C4 was the medical combat support exercise. Among the scenarios presented to the students was an ambush by the "enemy" while the physicians tried to rescue casualties from a downed helicopter.

Members of the 1st Marine Division at Camp Pendleton, CA, were the aggressors, attacking to slow or stop the progress of the medical unit. Resuscie Annies lay "dying" as the physicians tried to sneak their way past well-hidden snipers.

And, if the sounds of bullets zipping past wasn't realistic enough for the students, there were simulated "gas" and smoke bombs ignited by booby traps around the casualties. Some of the patients "died" as did some of the physicians.

But the point was made—treating patients in the field with limited equipment, during aggressor action, with vision and dexterity restricted by protective gear isn't the same as treating them in a crisp, clean hospital room. That's what it means to be a military physician.

The triage scenario was on a much larger scale. Scores of "casualties" were brought into a combat support hospital, a mobile hospital similar to that on M*A*S*H. The military physicians, supported by personnel and equipment from the 41st Combat Support Hospital at Fort Sam Houston, had to treat the casualties.

Again, the 1st Marine Division jumped in to act—as the casualties this time—kicking and screaming as if they were really in pain. The support personnel from the Marines, Army, and Air Force created a real-life atmosphere during each of the C4 exercises.

The physicians assessed the situation, decided what action was necessary, whether the patient could be quickly patched up and returned to his unit, or required more extensive treatment.

A "victim" of chemical warfare is treated by tri-service physicians.

In addition, the triage exercise familiarized the physicians with two other major aspects of their job: supervising enlisted personnel—both medical and others—and advising their commander on appropriate medical action during a field emergency.

Ferguson stressed that good medical supervision and a complete understanding of combat medical philosophy are musts in the training of military medical officers. The classroom sessions initially prepared the C4 physicians for these decisions.

The designers were pleased with their new course, but details about its future won't be determined until after this prototype has been evaluated thoroughly. While similar courses have been and are being practiced in individual services, none has emphasized hands-on field medical training to the degree that the C4 does.

A lot happened during the week. Some time was spent acquiring knowledge, some spent simply experiencing a different medical environment. If these doctors ever go to war, the experience may turn out to be the more important.

—Story by Mary Storms, Army Health Services Command, Fort Sam Houston □

Getting themselves and patients safely through an obstacle course gives physicians a taste of combat conditions.

Reducing the Expense of X-Ray Discard Film Through Quality Control

LCDR James D. George, MSC, USN

In the past few years, attention has been directed toward the reduction of radiological exam costs and patient radiation exposure through implementation of radiological quality control programs. Opinions differ as to the appropriate size and complexity of quality control programs and their cost effectiveness. (*1,2,3,4*) The national average for film waste is said to be approximately 10-12 percent. (*5,6,7*) There are strong arguments that this value can be significantly reduced with a corresponding savings in cost and radiation exposure.

At NRMC Great Lakes, waste film had been routinely placed in empty film boxes and stored in a closet. This presented a unique opportunity to evaluate waste before and after implementation of a quality control program begun in November 1978.

Data Collection

At Great Lakes, x-ray film used to leave the Radiology Department in one of two ways. Either it was filed in the patient's jacket or was dumped into the discard film bin. When the bin was full, the film was transferred to empty film boxes and stored until the first of the year, when it was turned in for silver recovery.

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Three boxes of old discard film were randomly selected from the storage closet. These represented two sample periods and constituted a control and an indicator of the discard film rate prior to establishment of the waste-reduction program. The discarded films in each box were in chronological order, representing 22 days worth of waste in February and 4 weeks in late summer 1978. There was an assortment of sizes among the 695 winter and 705 summer discards. One of the three boxes contained nonsequential discards and old roll film and was not used to estimate the 1978 waste rate.

Groups of three to four x-ray technicians reviewed and categorized the film; a physicist acted as recorder. Each film was displayed and discussed until agreement was reached as to the reason for its unsatisfactory status, i.e., overexposure, processor malfunction, incorrect positioning, etc. Each group worked for one hour or approximately 200 films, and every technician participated in at least one group.

Preliminary Survey Results

Review of the 1978 data did not indicate the potential for major economic savings through an extensive quality control program. The film discard rate of 8.5 percent was lower than the national average. However, the survey did reveal some nonquantitative information indicating a potential for reduction of film waste:

- The technicians had developed the habit of flashing patient identification information on the film prior to shooting the exam. If they did not use all the flashed films for x-rays, they discarded the extras.
- Film cassettes were often left in the x-ray room at the change of shifts. The new shift's personnel, not knowing if the cassettes had been exposed or fogged, ran the film through the processor.
- Black films were being produced by a few cassettes with damaged latches that would accidentally release, exposing the film to light.
- Although a subject of much anguish in the department, it was not apparent that mechanical failures were contributing to a major number of bad films. Discussions with the technicians during the review did indicate that the x-ray machines needed calibration, that each of the four identical three-phase x-ray machines required different KvP and MaS settings for the same exam. Also, x-ray machine down time seemed excessive and unusually recurrent. The technicians felt that some films categorized as technique errors were due to x-ray machine failure.
- The small number of processor-destroyed films were neither representative of the time lost nor the

patient inconvenience due to film processor failure. Film processor down time was approximately 20 percent.

- The motion discard films were almost entirely pediatric chest films.
- The individual technicians retake rate appeared to be inversely proportional to the extent of the technician's formal training, registry completion, and experience. Positioning errors seemed to be particularly related to the length of the technician's formal training program. This finding was consistent throughout the study and agrees with a similar review performed by the Army. (*8*)

Although the waste film rate at Great Lakes is relatively low, the data suggested that it might be reduced even further by simple and inexpensive administrative techniques. These would reduce or eliminate such practices as preflashing or abandonment of cassettes. The present, modest quality control program resulted from this study. It involved modification of the administrative procedures and monitoring of the cleaning and operation of the x-ray film processors.

In January of this year, the program was expanded to include updated technique charts and monitoring of x-ray machine calibration and repair. Periodic group review of discarded film was continued. Overall, the program cost approximately $2,000 for equipment and involved approximately 12 technician manhours per month.

After the quality control program had begun, additional samples were evaluated. These included the discards of March, June, and July 1979.

Overall Program Results

The results of the review of discarded films before and after implementation of the quality control program are presented in Tables 1, 2, and 3.

Three general causes of waste were initially established: technician error, mechanical failure, and administrative waste. Technician errors include errors in patient positioning and selection of x-ray technique. Mechanical failures include destruction of film by the processors and identifiable failure of the x-ray machine. Administrative causes of film waste are defined as films flashed with identification information, but not used, and films fogged by being left in the x-ray rooms. Both "Technician Errors" and "Administrative Procedures" discards decreased after implementation of the quality control program.

Table 2 displays a detailed analysis of the causes for film rejection. The "Other" category included test films, scout films, subtraction mats, nonretained tomographic slices, and a few films of unknown rejection cause. All categories of discarded film decreased after introduction of the quality control program except those due to x-ray machine malfunction and the "Other" category. These may have remained constant because the x-ray machine malfunctions were primarily spot film failures. Generator or MaS failures would probably be classified as technique errors. The "Other" category is more of a reflection of normal waste from certain types of exams.

Table 3 demonstrates different ways of recording film usage proficiency to allow comparison with other departments. The "Technician Retake Rate" is the percent of films repeated due to "Techniques," "Positioning," and "Motion." The percent of "Film Waste Rate" is the percent of films discarded with respect to total films purchased. The "Ratio of Discards/Exposures," expressed as a percentage, is the ratio of the number of films discarded to the total number of exposures. The "Cost of Discard Film/30-day Month" is an evaluation of the daily chemical and film cost by film size extrapolated to a 30-day period. The "Cost/1,000 exposures" is the prorated sum of the film and chemical cost per 1,000 exposures. For these cost evaluations, it was estimated that the chemical cost was equal to 10 percent of the film cost. Film cost was the sum of the actual cost of each sheet of discard film. Implementation of the quality control program resulted in a 40 percent reduction in the discard film costs. Although the total monetary savings at this facility are modest, the funds spent directly for quality control equipment will be recovered if the reduced waste rate continues for one year.

The Navy annually exposes a little more than 6 million medical x-ray films. (*9*) If the data in Table 3 were applied to savings estimates for the entire Navy, the figure would be $90,000 saved. If the average waste rate in the Navy is 10-12 percent as in a civilian community, then a 40 percent cost reduction would save $123-149,000. Two unpublished surveys at major naval hospitals showed a waste rate of 26 percent at one institution and a technician retake rate of 10.5 percent at the other. Wide variations in waste rates among x-ray departments and differing potentials for remedial efforts are to be expected. Consequently, rendering such a Navy-wide savings estimate is very speculative but nevertheless intriguing.

The most effective part of this program seemed to be the film review with the technicians. It cost nothing but time and it provided an excellent learning experience and means of communicating the tech-

TABLE 1. General Discard Categories
(Number Films Discarded/1,000 Exposures)

	Prior to Quality Control Program		After Quality Control Program		
	Feb 1978	July-Aug 1978	Mar 1979	Jun 1979	Jul 1979
Technician Error	40.9	41.3	29.3	21.9	14.0
Administrative Procedures	23.9	24.9	10.8	6.5	14.9
Mechanical	2.29	3.21	4.8	0.0	2.53

TABLE 2. Detailed Discard Categories
(Number Films Discarded/1,000 Exposures)

	Before Quality Control Program		After Quality Control Program		
	Feb 1978	July-Aug 1978	Mar 1979	Jun 1979	Jul 1979
Technique	27.2	31.9	25.7	19.6	21.7
Positioning	13.8	9.4	3.6	2.3	9.3
Motion	2.1	1.4	0.3	1.9	1.2
Flashed/Clear	11.8	7.4	4.3	2.4	6.3
Fogged	1.0	5.1	0.5	1.2	3.9
Clear	11.1	12.5	6.0	2.9	4.8
Black/Green	8.5	10.9	5.7	3.9	3.6
Processor	1.8	1.7	0.4	0.0	1.5
X-ray Machine	0.5	1.5	4.4	0.0	1.1
Other	7.5	4.1	5.8	6.5	7.3

TABLE 3. Discard Rate and Cost

	Before Quality Control Program		After Quality Control Program		
	Feb 1978	July-Aug 1978	Mar 1979	Jun 1979	Jul 1979
Technician Retake Rate	4.0%	4.1%	3.5%	2.6%	3.6%
Percent Film Waste	7.84%	7.89%	5.35%	3.90%	5.70%
Ratio Discards/ Exposures	8.50%	8.58%	5.65%	4.10%	6.10%
Cost Discard Film/ 30-Day Month	$358.00	$378.00	$255.00	$158.00	$252.00
Cost/1,000 Exposures	$40.40	$43.53	$24.80	$16.85	$25.90

nicians' problems in producing good x-rays. It also stressed the concept of quality control, and it demonstrated that the officer staff valued the technicians' performance. Moreover, the program emphasized the value of the technicians' opinions, knowledge, and experience in the quality assessment process.

Tables 2 and 3 indicate an increase in discard rate in July 1979. Possible reasons for this include relaxation of the attitude toward quality control, statistical variance, mixing of a few days of June's film with July's, the necessity of shooting all skull films with an overhead tube pending head unit replacement, training of three new OJT (on-the-job training) technicians, and loss in leadership due to the summer changeover in radiology physician staff. The increased rate of positioning errors suggests that training of the new OJT technicians is an important cause. Many factors probably contribute and continued review of the program may clarify this.

There were additional improvements not directly reflected in the decreased film discard rate. Among these were:

- **Better film processor performance.** The monitoring and supervised cleaning of processors revealed that silver deposits had frozen the recirculation impellers and the recirculation pumps had not been working for a considerable period of time, perhaps months or years.
- **Improved silver recovery.** Silver deposits clogged the film processor drain lines to the silver reclaimers. Consequently, silver reclamation had decreased. Again, it appeared that no silver had been reclaimed for a considerable period of time.*
- **Improved x-ray machine performance.** The milliampere stations on the x-ray machines were out of calibration by 20-50 percent. Also, many small ancillary parts of the equipment needed repair.
- **Better quality of films produced.** Subjectively, the staff radiologists and consultant radiologists from two civilian groups noted improved film quality.
- **Reduced machine repairs and down time.** Prior to implementation of the quality control program, an average of two units/day out of a total of 20 were inoperable. The program identified previous inadequate service and many small defects causing major breakdowns. In June and July only one machine/week was down.

Considering the number and variety of factors contributing to the discard film rate, it is surprising that the rate at Great Lakes was lower than the national average prior to implementation of the quality control program. This reflects an unusually competent and conscientious staff. In their desire to produce quality films, the technicians had emperically compensated for some of the mechanical problems that decreased the quality of their radiographic "product." For example, they had increased the chemical replenishment rate to offset the undetected lack of recirculation, they varied only KvP and time in their technique, they specialized their techniques to match each room's idiosyncracies, and they assigned the more difficult exams to the senior technicians. The technicians felt their repeat rate was reasonable, and the radiologists were satisfied with the quality of the films. Therefore, no formal effort had been made to improve the system.

The implementation of a modest quality control program within a system that by film discard rate standards was already better than the national average, resulted in the discovery of easily corrected flaws and lead to a better quality, more economical product.

*Ed. note: When this article was written, the price of recovered silver was about $1 per pound. It is now about $4 per pound.

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Tooth Replantation

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Tooth replantation is the process of replacing a tooth in its socket after it has been displaced either through traumatic avulsion or through intentional extraction. The rationale behind replantation is that a natural tooth is its own best replacement.

Replantation is not a new idea. The Arabian author Abulcasis (1050-1122) wrote on the subject in *De Chirurgia:* "Sometimes when one or two teeth have fallen out, they are replaced in the socket and bound in the aforesaid manner [ligatures or gold wire to the adjacent teeth] and remain there. The operation must be carried out with great delicacy and ability, by skillful hands." (*1*)

In 1561, Paré advised, "In the extraction of a healthy instead of a diseased tooth, replace it immediately and bind it to a neighboring tooth; by this means the tooth can take root again." (*1*) This advice must have been welcome indeed to the poor practitioner whose carelessness or misdiagnosis had led him astray during extraction procedures. Fauchard, (*1*) writing in *Le Chirurgien Dentiste* (1728), concurs by advising immediate replantation of accidentally extracted teeth and replantation of sound teeth that must be extracted to alleviate severe pain.

John Hunter, writing in *Natural History of the Human Teeth* (1778), says, "In cases where the cavities penetrate some depth, without, however, the destruction of the crown so extensive as to render it useless, the best mode of treatment is extraction and replantation, after having subjected the tooth to boiling in order to cleanse it perfectly and to destroy its vitality entirely." (*1*) Hunter believed that the destruction of the pulp was absolutely necessary for the retention of the tooth. He felt that any pulpal or periodontal tissue remaining on the tooth could be a source of disease and, hence, a cause for loss of the tooth.

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Chapin Harris, a 19th century dental author, says of his mentor, John Randall, a physician and dentist, "Dr. Randall's success in engrafting teeth was very great. He was extremely careful not to jar the root; to make a close fit; to see that it articulated accurately with opposing teeth; to finish the operation in as short a time as possible, thereby greatly lessening the danger of inflammation. I am confident that while I was his pupil the proportion of cases where inflammation and suppuration followed this operation was not one in twenty. He considered ten years the average time for a good root to last and support a new crown; though many of the teeth engrafted by him have done good service from twelve to fifteen and some twenty years." (*2*)

It is unclear whether Harris' term "engrafting" referred to transplantation or replantation. Regardless of the specific reference, several sound principles in Dr. Randall's technique are still germane today: careful handling of the root, concern with the occlusal relationship of the replanted tooth with opposing teeth, and swift completion of the operation. The idea of splinting mentioned by Abulcasis and Paré and the concept of eliminating the pulp as a source of disease outlined by Hunter are still applicable in modern dentistry and serve as a historical basis for the more sophisticated and scientific techniques in use today.

Today, the definition of replantation is, according to Grossman, "the insertion of a tooth in its socket after its complete avulsion resulting from traumatic injury." He distinguishes replantation from intentional replantation, which he defines as "the intentional removal of a tooth and its reinsertion into the socket after resection and obturation of the root canals. (*3*) Although these definitions may not encompass all modern replantation concepts, they separate replantation procedures into two categories that involve the circumstances under which a tooth is considered for replantation. The purpose of this paper is to review the indications, contraindications, techniques, and prognoses for replantation procedures with reference to the definitions put forth by Grossman.

Replantation of Avulsed Teeth

Indications for replantation of avulsed teeth are simple. The tooth root must be intact so that the tooth can be treated endodontically and restoratively if necessary, the tooth must be available, and the patient should be in a physical and emotional state to accept the procedure. Most authors do not bother to list indications for replantations, assuming that the indications are obvious. Their approach seems to be one of justifying replantation versus a prosthetic procedure.

Weine, (*4*) taking a somewhat pessimistic approach, feels that most replanted avulsed teeth will eventually succumb to resorptive processes but that replantation is worthwhile because most of these patients are young. Replantation in the young patient gives an immediate replacement for the unesthetic gap left in the arch, time for the tissues to heal before preparations are made on adjacent teeth for a prosthetic replacement, time for the root canals in the adjacent teeth to diminish in size prior to preparation of the teeth for a bridge, and time for emotional and psychological adjustment and acceptance of the situation by the patient and the parents.

Will (*5*) lists orthodontic and socioeconomic indications in addition to those enumerated by Weine. He says that nonreplaced teeth will lead to space loss and migration of adjacent teeth and that replantation of an avulsed tooth can postpone or negate the future need for a costly prosthesis.

Contraindications for the replantation of avulsed teeth are few. Again, most authors do not address this subject directly. In this writer's opinion, replantation would be contraindicated when a tooth has been rendered unrestorable in an accident; there is a loss of alveolar bone and other supporting tissues, which could preclude adequate healing or stabilization; there has been an excessively long period of time since the accident, during which adjacent teeth may have migrated toward the space or the socket may have remodeled in such a way that a surgical procedure would be needed to make room for the avulsed tooth; there are no materials available for stabilization of any kind; or the tooth in question is a primary tooth that would soon be lost anyway.

Complications involved in replantation involve subsequent resorption of the root and possible infection resulting from contamination of the tooth or alveolus. (*3, 4, 6*) Resorption is more common in cases in which the tooth has been out of the socket for more than 30 minutes, (*4, 6, 7*) the tooth has been sterilized or disinfected with germicides or has lost all or part of the periodontal ligament, (*3, 4, 6, 7, 8*) or the socket has been curetted prior to replantation. Infection from replantation is not usually a problem when the operation is performed by a knowledgeable dentist, but in cases in which there is doubt as to the cleanliness of the tooth or socket prior to the replantation, antibiotic coverage is recommended. Tetanus toxoid administration is recommended in all cases. (*3, 7*)

The technique of replantation has many variations and has been changed over the years as new information has been made available through research and clinical evaluation. A good technique outlined by Cohen and Burns (*6*) includes the following steps:

- Placing the tooth in a warm saline solution to keep the periodontal fibers from drying out.
- Making no attempt to sterilize or disinfect the root surface.
- Irrigating the clot from the socket. No curettage.
- Performing complete endodontic treatment on immature teeth before replantation.
- Replanting the tooth immediately.
- Stabilizing the replanted tooth with a splint and keeping the splint on for four to six weeks, until mobility is minimized.

This technique includes several procedures that are still controversial. In step four, endodontic therapy prior to replantation is recommended for immature teeth. Heithersay (*7*) recommends filling with calcium hydroxide if the tooth has been out of the mouth for more than two hours; if less than two hours has elapsed, simple replantation without endodontic procedures is recommended. The question of when to anesthetize the patient is not mentioned in the Cohen and Burns technique. Pearson and Nicolazzo (*9*) advise no anesthesia until the physical and neurologic status of the patient have been determined. Most authors either do not mention this point or they concur with Pearson and Nicolazzo.

Step five raises the question whether to extirpate the pulp in a fully formed tooth prior to replantation. Cohen and Burns, (*6*) Weine, (*4*) and Heithersay (*7*) generally agree that extirpation is indicated in nearly all cases prior to replantation. Grossman (*3*) and Massler (*8*) feel that, if the tooth has been gently handled, is moist, and has been out of the socket for 30 minutes or less, no extirpation is indicated prior to replantation. Massler states that, in a few cases, pulps may maintain some vitality even if several hours have passed prior to replantation (six is the limit).

In summary, most authorities agree that 30 minutes is the maximum time an avulsed tooth may remain out of the socket without a high probability of subsequent pulpal necrosis and resorptive phenomena after replantation. The period from 30 minutes to 90 minutes (*6*) or two hours (*7, 8*) seems to be one in which pulp death will

be likely to result, but periodontal ligament survival is probable. All authors qualify these times with reference to the handling of the tooth prior to replantation. It would appear that good practice would dictate pulp extirpation in all cases in which the replantation occurs two hours or more after avulsion.

Step six in the Cohen and Burns procedure involves splinting. Perhaps on no other point has there been more controversy in the replantation procedure. A myriad of splint designs has been proposed, including ligatures, (*1,3,6,10*) orthodontic bands with ligatures and/or arch wires, (*3,4,6*) hard acrylic resin mouthguard-type splints, (*6*) soft acrylic resin mouthguard splints, (*12*) periodontal packs, (*8,13*) endodontic implants, (*14*) and orthodontic arch bars with direct-bonded brackets. (*15*) It has even been suggested (*16*) that there should be no splinting at all. Suggested materials for making a splint include acid-etched resins (*7*) and quick-curing acrylic resins. (*3,6,11*) Andreasen (*17*) has summarized the requirements for a successful splint:

1. It should be fabricated and applied to the traumatized segments without laboratory delay at the emergency appointment.
2. The splint should be applied with a minimum of further trauma to the pulp and periodontal ligament.
3. It should achieve immobilization of the injured segments in the patient's normal anatomical position.
4. It should provide the necessary stabilization for the entire splinting period.
5. It should not predispose the pulp or gingiva to further injury.
6. It should allow for further testing of the teeth and for further operative procedures.
7. It should be reasonably esthetic.

It is clear that most authorities favor splinting initially, and the type of splint used depends on the occlusal relationships, arch form, degree of trauma, position of the tooth in the arch, materials available, and the skill and preference of the dentist. The time of stabilization is very controversial, varying from three to eight weeks. (*4,11,18,19*) Massler (*8*) advises loose or short-term splinting to allow for slight movement of the tooth in the alveolus. Such movement is said to allow for functional arrangement of the healing periodontal fibers and to help prevent ankylosis.

Another point of contention in the replant procedure is the question of whether to cut off about two mm of the apex to aid in repositioning the tooth. Massler (*8*) and Heithersay (*7*) advise against this procedure unless the tooth will not seat into its original position. The rationale for cutting off this apical portion is that blood clots, edema in the periodontal ligament, bone chips, etc. might cause incisal displacement of the tooth during the postoperative period. (*3,7*) This is not considered a problem if the tooth is adequately stabilized.

Venting, trephining through the cortical plate of bone to the apical end of the socket, has been practiced for centuries to accomplish the same purpose as the pre-replant apicoectomy. This procedure is no longer recommended and is considered unnecessary. (*4*)

The question of when to begin endodontic therapy in replanted teeth is also controversial. Weine (*4*) and Grossman (*3*) advise waiting until mobility has decreased, Cohen and Burns (*6*) say to wait two to three weeks, and Heithersay (*7*) recommends treatment after 10 days if access can be gained through the splint. The important concept here is to clean and shape the root canal before necrotic tissue breakdown products or bacterial invasion of the pulp can cause pain, infection, and increased mobility in an already compromised tooth.

Intentional Replantation

Intentional replantation is a surgical procedure that is employed primarily for posterior teeth as an alternative to extraction when conventional endodontic therapy or apical surgery is impossible or contraindicated. (*4,20*) Weine lists the following situations in which intentional replantation procedures are indicated:

1. When routine endodontic treatment of teeth is impractical or impossible, as in patients who are unable to keep their mouths open for the necessary length of time.
2. When an obstruction of a canal is present, such as a broken instrument or a calcification, or a periapical radiolucency is present, yet routine surgery is impractical, as in a lower molar with the mandibular canal in proximity.
3. When perforating internal or external resorption is present, yet surgery is impractical.
4. When a foreign body, such as molten metal, is in the periodontal ligament or periapical tissue but surgery is impractical.
5. When a previous treatment has failed but nonsurgical retreatment or surgery is impractical. (*4*)

A thorough review of intentional replantation was published in *Transactions of the Fourth International Conference on Endodontics* in 1968. Deeb, in his paper read at the conference, gave the following procedure for intentional replantation:

1. The patient's medical history is reviewed.
2. Full mouth x-rays are made in order to evaluate the general oral condition.
3. An oral examination is made and the patient's

general oral condition is evaluated and noted.

4. The etiological factors are noted on the chart.

5. The coronal and apical condition of the teeth to be treated are evaluated by means of x-ray and clinical examination.

6. The patient's consent form is signed before treatment is begun.

7. Antibiotic is administered, preferably a wide-spectrum antibiotic.

8. The surgical area is anesthetized with a local anesthetic solution of choice.

9. A sterile tray is set up with all instruments needed to carry out the necessary procedures on the tooth involved. This includes paper points, silver points, gutta-percha points, pulp canal reamers, both manual and handpiece types, irrigation syringes, medicine glass, pulp canal sealer, saline solution, pluggers, periodontal pack, cold-cure acrylic, contra-angle and burs, diamond stones, and sterile 2 x 2 gauze; silver amalgam, plastic restorative materials, temporary cements, and surgical instruments for extraction of tooth.

10. When anesthesia is complete, the operative field is prepared with Metaphen and the tooth is extracted.

11. The apical area is curetted; and if any apical tissue is removed, its characteristics are noted on the record. Also noted is the presence of a buccal or labial perforation, if any.

12. The patient is then allowed to bite on a sterile gauze pack while the root canal therapy is carried out.

13. After completely obturating the foramen, the crown of the tooth is treated by placing an adequate restoration.

14. The tooth is replanted in the alveolus with finger pressure. At times it was necessary to shorten the roots to allow the replantation of the teeth.

15. The tooth is stabilized by means of a periodontal pack or quick-set acrylic forming a temporary splint.

16. Postoperative x-ray is made.

17. A prescription for an antibiotic is given for a three-day period.

18. The patient is instructed to return in two weeks for x-ray and clinical examination.

19. The acrylic splint is left in place one to two weeks. The periodontal pack is changed after one week. (*20*)

Gross nan (*3*) recommends cutting two to three mm off of the apical end of the roots prior to retrofilling the root ends. This would seem appropriate in posterior teeth, where replantation is generally more difficult than in anterior teeth.

Contraindications for such a procedure are listed by Deeb (*20*) as:

1. Large restorations in the tooth in question, which may cause fracture of the crown on extraction.

2. Destruction of bone on buccal or lingual surface as well as in bifurcation and trifurcation areas.

3. Severe periodontal disease that has caused loss of attachment apparatus.

4. An uncooperative patient.

5. An unfavorable crown/root ratio.

6. The probability that the tooth cannot be restored adequately.

Root Resorption

Resorption of the roots is the most common complication of any replantation procedure. (*6*) It is not within the scope of this paper to investigate the physiology of root resorption, but I shall review clinical and experimental literature that deals with conditions leading to or halting resorptive phenomena with respect to replantation and intentional replantation.

Deeb *et al.* (*21*) reported that the tooth's location in the arch did not seem to affect the overall success rate of the replantation procedure or have any bearing on the incidence of root resorption, and that the incidence of resorption appeared to be unrelated to the sex of the patient. However, age appeared to be a factor because subjects younger than 17 had significantly more root resorption than those from 17 to 30. In addition, the shorter the time the tooth roots and the alveolar socket were exposed to the outside environment, the less resorption there was.

In 1965, Jonck (*22*) evaluated 60 replanted human teeth that had the periodontal ligament stripped away and were stored in human uncoagulated blood for 8 to 10 days prior to replantation. Without showing numerical results, he claimed that teeth stored in such a way were more likely to be replanted successfully than those replanted immediately, because the stored teeth had less antigenic potential and had been "conditioned" by the blood to be accepted by the body upon replantation. In spite of his strange results, his suggestion that a replanted tooth may serve as a foreign body or may be antigenic might have some element of truth.

Simon and Kimura (*23*) investigated 30 intentionally replanted roots that had been treated endodontically after extraction. They hoped to see bone growing over the roots and minimal resorption so as to have the roots help to maintain bone for an overdenture. They found no bony overgrowth after 18 months, and many of the roots showed resorption.

Kemp, Grossman, Phillips (*24*) evaluated 71 teeth that had undergone replantation procedures. A group evaluated after two years showed a 63.4 percent survival; after three years, 50.7 percent survived. In both groups, over 77 percent of the teeth showed some re-

sorption. This supports Weine's(*4*) contention that replantation is at best a holding procedure. Kemp *et al.* emphasize the necessity for educating the public in how to deal with avulsed teeth so that more teeth might receive the swift, correct handling that could lead to increased longevity of the replants.

Studies of intentional replantations have shown varying degrees of success. Grossman(*25*) showed 80 percent success after five years in 45 cases; Deeb *et al.* (*21*) showed 10 to 74 percent success in 274 cases after using four different techniques over a five-year period. Weine(*9*) points out that a great problem is that of criteria for success. No one seems to play by the same rules.

In innumerable animal studies, investigators have sought to control the variables inherent in clinical procedures and to investigate different treatment modalities more fully. Nasjleti *et al.* (*26*) found that intentional replantation of monkey maxillary incisors after endodontic treatment yielded the following facts: A new attachment will be formed in about seven days, orientation and maturation of the fibers of the periodontal ligament are not observed until four months after replantation, and changes toward root resorption and ankylosis can be seen as early as 14 days after replantation. Barbakow *et al.* (*27*) replanted monkey teeth without prior endodontic treatment or removal of pulp tissue. After eight weeks, resorption, periapical abscess formation, or ankylosis was seen in nearly all cases.

In another study, Barbakow *et al.* (*28*) investigated the effect of two percent acidulated sodium fluoride solution on the roots of extracted monkey incisors that were replanted after endodontic therapy. Eight weeks after the operation, all teeth were retained, but ankylosis was seen at four weeks after the operation, and resorption was recorded as early as two weeks after surgery. The fluoride solution apparently did not change the resorptive phenomena. In a recent study, Barbakow *et al.* (*29*) investigated the effect of thyrocalcitonin on tooth mobility in replanted monkey teeth. Tyrocalcitonin has been shown to reduce osteoclastic activity, and it was postulated that administration of this chemical might reduce tooth mobility after replantation. No difference was seen between the experimental and control groups.

Caffesse *et al.* (*30*) reported a long-term study of intentionally replanted monkey incisors. The extracted teeth were endodontically treated, replanted, and splinted for a short period. After four years, apical root resorption was found to be universal. Ankylosis, arrested resorption, and nonfunctionally oriented periodontal fibers were seen. In some cases, ankylosis had caused total obliteration of the root.

Skoglund *et al.* (*31*) investigated the revascularization potential of intentionally replanted dog premolars and incisors with open apices. After 30 days, the entire pulp space had revascularized in most teeth, and the investigators concluded that replanted teeth with open apices have a high potential for repair.

Conclusion

What, may we ask ourselves, does all this mean? How will we treat our patients in view of the evidence before us? We must understand some basic principles if we are to use the techniques of replantation and intentional replantation with the greatest probability of success. First, we must understand that these procedures are the last gasp before extraction. As Weine(*4*) and Kemp(*24*) have stated, these procedures should be viewed as no more than temporary. Unqualified long-term successes are very rare and should not be expected. Second, as Cohen and Burns,(*6*) Weine,(*4*) and Kemp(*24*) have cautioned, prevention of trauma or broken instruments in root canals should be our first priority so that replantation procedures should not be needed. This point requires education of the public as well as skill on the part of the dentist. Third, if replantation procedures are inevitable, speed, care in handling, and followup are the keys to the greatest success. Weine(*4*) mentions that reported success for replantation of avulsed teeth is less than for intentional replantation, in which the success rate is but a poor second to that of routine endodontic therapy or even routine apical surgery. Replantation should not be considered a faster alternative to apical surgery. Our greatest success in therapy can be gained by knowing the advantages and disadvantages of all our techniques and knowing when and in what order of preference to use them.

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Recruits Receive Baseline Audiograms

All recruits now undergoing training at Recruit Training Center Great Lakes receive a reference audiogram during their medical inprocessing. This program is serving as the pilot project for all Navy Recruit Training Commands and Marine Corps Recruit Depots.

As a permanent part of the health record, these valid baseline audiograms will provide the necessary reference for documenting actual hearing loss. This program should be especially beneficial to fleet and other operational units that do not always have the capabilities to obtain a valid reference audiogram.

Providing audiometric testing to as many as 240 recruits per day required the hiring of four civilian hearing conservation technicians. The recruits are first tested on automatic audiometers in three group (four-man) test chambers. When a valid audiogram cannot be obtained by this method or the recruit's hearing level fails to meet entrance standards, he is retested using a manual audiometer in a single-man test chamber. If a hearing problem is still suspected, the recruit is referred to an audiologist or ENT physician for further evaluation.

This pilot project was developed and funded by the Navy Environmental Health Center and is now jointly managed by the Naval Regional Medical Center, Regional Occupational and Preventive Medicine Service, and the Branch Clinic, Recruit Training Command. It will enhance the overall hearing conservation program at Great Lakes. This program previously included reference audiometry for all Service School Command students beginning training in ratings where noise hazardous exposure is likely to occur and conducted routine monitoring for all military and civilian personnel exposed to hazardous noise.

Dental Amalgam

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With the development of the new high-copper (9 to 29 percent) amalgams has come a whole new era of amalgam materials, which offer quality superior to that of the conventional alloys of the past. The purpose of this paper is to discuss advantages and handling characteristics of these new high-copper alloys.

Experimentation with high-copper dental amalgam is not new. There were references to such alloys in the early 1920s. (*1*) At that time the copper was being substituted for tin which caused excessive expansion. In the current high-copper alloys, however, a portion of the silver content has been replaced with copper; this has resulted in superior physical properties. Since the patenting of Dispersalloy (12 percent copper) in 1963 by Innes and Youdelis, (*2*) research has shown that several of these new amalgams have compressive strength (both early and late) superior to that of low-copper amalgams, and the new alloys require less mercury for proper trituration. These alloys have less than 1 percent creep compared with more than 2 percent for most of the conventional alloys. Research has linked increased static creep with increased marginal breakdown of amalgam. (*3*) Therefore, the percentage of creep is being advocated as a predictor of clinical performance of amalgam restorations. (*2*)

Because of these advances, several high-copper amalgams have been given Federal stock numbers and are now on the stock table. In addition to Dispersalloy (Johnson & Johnson Dental Products Co.), which is already in the Federal stock system, Sybraloy (Kerr Mfg, Co.), Phasealloy (Phasealloy Co.), and Tytin (S.S. White) will be available in various forms.

Is the use of these high-copper alloys justified in light of their extra cost? Even with the higher cost of 5 ounces of Dispersalloy vice that of Caulk Fine Cut (Caulk Co.), and the number of restorations that can be done with 5 ounces of alloy (100 restorations if four pellets are used for each restoration), one quickly begins to see how insignificant this cost factor is. The truly great expense is the cost of the dentist's time to replace faulty restorations. What is most cost effective is to use the very best dental amalgam material available and to stress quality techniques in an effort to reduce time-consuming "redos" of the broken-down amalgams that we see every day. The use of the rubber dam, removal of decay and undermined enamel, proper matricing, etc., must not be sacrified. In the presence of sloppy techniques, NO amalgam will be successful.

These high-copper alloys are far more sensitive than conventional amalgams to mercury/alloy ratio and trituration time. Therefore, it is necessary to use clean capsules and suitable pestles and to adhere to the proper mercury percentage. Many dental officers have complained that Dispersalloy, at a 1:1 ratio, has been too dry to use. The single-speed "Wig-L-Bug" amalgamator probably cannot overcome inertia enough to wet all powder particles thoroughly. If the "Wig-L-Bug" is the only amalgamator available, try precrushing the Dispersalloy tablets (no more than two pellets per mix); then add mercury and triturate for approximately 18 to 20 seconds. If the mix is still too dry, changing to 51.6 percent mercury ("D" plunger on the Caulk mercury dispenser) should remedy this dryness.

On the other hand, a 1:1 ratio ("E" plunger) used with Caulk's Vari-Mix amalgamator may also produce a dry mix even when trituration is performed at the recommended M-2 setting for 10 to 12 seconds. Improper amalgamator speed may be the problem. Well over 90 percent of these triturators will run too fast once they have been in use a short time if the M-2 setting is not calibrated (3,600 ± 200 cycles per minute). If you cannot calibrate the amalgamator because the strobe light used for calibrating is not available, try triturating at a lower setting, e.g., L-2, to obtain a "wetter" mix.

Weights and sizes of alloy pellets also vary with different manufacturers. For this reason, it is wise to use the recommended mercury dispenser for each alloy system. Even then, there should be preliminary experimentation to determine the desired alloy/mercury ratio and proper trituration time before any new alloy material is used clinically.

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Pharmacy Involvement in an Interdisciplinary Primary Care Clinic

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The latest data available indicates that even considering the influx of foreign trained personnel, the military health care system is still understaffed with physicians. Because of political, financial, and philosophical considerations, it appears there will be no remedy for this critical problem in the immediate future. The Uniformed Services University of the Health Sciences is unquestionably a step in the proper direction but certainly not the complete solution. It becomes apparent that we must look in other directions to bridge the chasm between patient needs and physician availability.

An efficient system must be evolved to channel the physician's time into the specific areas of maximum benefit. How can we facilitate the maximal utilization of physician time to improve patient care?

A concept already being employed by the Navy is the training and utilization of physician extenders such as nurse practitioners and physician assistants. However, there is a large quantity of relatively untapped talent available in the form of pharmacists, specifically clinically trained pharmacists. Utilization of pharmacist physician extenders in specific areas where it is possible to train individuals to function as effectively as the physician, seems a viable alternative. (*1,2,3*) Some of the conditions which would be amenable to this type of application would be hypertension, (*4,5,6*) diabetes mellitus, (*7,8*) anticoagulant therapy, and hyperlipidemia. Involvement in other areas such as outpatient cancer chemotherapy (*9*) and hyperalimentation could also save an appreciable amount of physician time.

Although the concept of utilizing physician extenders is an accepted concept, an important question arises. Why use pharmacists?

All the previously mentioned areas of possible involvement have one very important similarity. These areas are treated primarily with drug therapy. In view of this fact, the pharmacist is a logical choice to augment the physician in these areas. After understanding the underlying physiology, we realized pharmacology is the most important knowledge applicable to the treatment of these patients.

Without even considering the physician shortage in the military, it would seem economically prudent for a pharmacist to follow a patient, if feasible, as opposed to a physician. (*10*) It is obvious that the cost of a pharmacist's time is considerably less than the cost of a physician's time. The physician's time could be employed in the treatment of the more complicated patient cases and the patients who have been referred from the physician extenders.

The area of pharmacy involvement in delivery of primary health care is definitely not a novel concept. In the Indian programs that the Public Health Service has instituted, there has been extensive pharmacist involvement for years. Some of the programs which have developed in the Appalachian area also have been models of pharmacist involvement in the delivery of primary health care.

One clinical area in which NRMC Long Beach, CA, Pharmacy Department has become involved is the treatment of hypertensive patients. This program was initiated following a discussion between the Internal Medicine Department and the Pharmacy Department. Both parties concurred that the Pharmacy Department's involvement would make a meaningful contribution to patient care in the area of hypertension. It has been shown that ". . . a well trained and motivated clinical pharmacist can be an essential part of the health care team caring for hypertensive patients. His services appear to help insure the success of treatment and are acceptable to the patients receiving them. Since the treatment successes were generally lost after the pharmacist investigator's involvement ceased, the pharmacist's services must be continued indefinitely to be most effective. This study suggests that the pharmacist may successfully assume increased responsibility for the long-term health care of patients with essential

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hypertension. This approach may partially relieve the physician manpower problem and increase the availability of the services we will need to adequately care for the millions of hypertensive patients yet to be detected, treated, or adequately treated." (*6*)

Once the Pharmacy Department was committed to involvement in the hypertension clinic, a training program had to be formulated. Taking the educational background into consideration, it became apparent that the main thrust of the training should be in the areas of physiology and anatomy, diagnosis, physical assessment, patient histories, clinician-patient interaction, laboratory tests, and a pharmacology review.

One of the first educational exercises undertaken was the participation in two postmortem examinations. Both autopsies were cardiovascular oriented, one case being a cerebral hemorrhage, the other a myocardial infarction. This experience helped place the textbook anatomy and physiology into proper perspective.

There are a multitude of articles dealing with diagnosis, assessment, and treatment of the hypertensive patient. (*10-20*) It is best to select and study a large number of these articles since there is a diversity of opinion in numerous areas.

Physical assessment poses a problem for the pharmacist but not an insurmountable one. The pharmacist can develop a degree of expertise, but out of necessity it will be rather specific in nature. It is important to recognize the limitations of a pharmacist in the area of physical assessment. There are numerous texts available on the subject, (*21-23*) but they are no substitute for patient contact. It is important to practice with a stethoscope, blood pressure cuff, and ophthalmoscope to develop the coordination and rudimentary skills necessary to examine the patient. Although there is much to be learned in this area through actual experience and a close educational alliance with a physician, it quickly becomes apparent that years of experience are required to develop the subtle skills possessed by the physician.

One extremely important area for the pharmacist is the development of the abilities required for a smooth patient-practitioner interaction. Learning how to put patients at ease and communicate with them seems like a relatively insignificant problem, but it can be of critical importance when taking a patient history and discussing the treatment plan.

The initial premise of the clinic was the treatment of the uncomplicated, essential hypertension patient. In reality, it becomes difficult to limit the patient population to uncomplicated, essential hypertension. Restricting the patient population is very critical to the success of the clinic due to the limited training of the pharmacist. As we gain experience it may prove more beneficial to have pharmacist involvement in the treatment of the complicated patient. In these patients there would obviously be more potential for drug-drug and drug-disease interactions.

Upon the initial visit, usually by referral, the patient is seen by both the pharmacist and the physician. The pharmacist takes the patient history, then a physical evaluation is performed jointly, thereby giving the pharmacist the opportunity to develop physical assessment skills. The appropriate diagnostic procedures and laboratory tests required for the initial evaluation are ordered. If appropriate, a medication regimen is instituted. The patient is referred to a dietician for a weight reduction diet and/or a salt restriction diet if necessary. The patient is counseled on hypertension and any questions that may arise are answered by either the physician or the pharmacist. The patient is referred to a patient education center where a film on hypertension is shown. The patient is given pamphlets on the disease, and information sheets on the antihypertensive drugs prescribed.

The pharmacist is assigned some of the uncomplicated essential hypertension patients on followup visits. These patients are seen independently at times, but with a physician always available for consultation. Since drugs are employed in the treatment of hypertension, most followup visits are aimed at evaluating the drug therapy of the patient. On a followup visit, the pharmacist interviews the patients he has been assigned. An assessment of blood pressure control and an evaluation of the medication regimen are made. Any pertinent laboratory tests are ordered and if necessary, changes are made in the patient's medication regimen.

As can readily be seen, the clinic is truly an interdisciplinary effort. It is not a multidisciplinary clinic where different professionals are working within their designated fields, but instead, an interdisciplinary clinic where the traditional stereotyped roles are being shed.

At the present time, we have not had a pharmacist credentialed to write prescriptions and order laboratory tests independently of the physician. Even though some of the patients are being seen independently, the physician's signature is still required to order medication or laboratory tests. In the future, we hope to obtain credentialing so as to be at least on equal parity with other physician extenders such as nurse practitioners and physician assistants.

We plan on developing both diagnostic and treatment guidelines in the near future to provide continuity to the clinic. In any military organization there is a continuous turnover of personnel; therefore, concrete guidelines would be a real asset from a training stand-

point. These guidelines would facilitate rapid assimilation by replacement personnel of the necessary information. The development of written guidelines may make credentialing of the pharmacist-clinician easier to obtain.

The Pharmacy Department would like to expand its involvement in other areas, such as a diabetic clinic and/or an anticoagulant clinic, where there are real opportunities to make meaningful contributions to the quality of patient care.

In conclusion, most chronic diseases are treated primarily with drugs; therefore, pharmacist involvement seems like a rational supplement to the available physician manpower. It is of critical importance that pharmacists realize their limitations, but at the same time they should not hesitate to develop and apply new talents in the best interest of patients. The real challenge is twofold; while increasing the quantity of patient care, we must also increase the quality of care.

The government would do well to assess the skills available in the marketplace, the price of utilizing these skills, and apply this information in a practical manner to patient requirements. Pharmacist involvement as physician extenders is one feasible mechanism of economically increasing the productivity of our present health care delivery system.

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NOTES & ANNOUNCEMENTS

IN MEMORIAM

LCDR Andrew A. Stefanyshyn, MSC, USN, former Navy industrial hygienist, died 11 May 1980 of a heart condition, at George Washington University Hospital, Washington, DC.

Born on 23 Feb 1944 in Lubaczow, Ukraine, LCDR Stefanyshyn immigrated to the United States in 1950, and became a U.S. citizen in 1962.

LCDR Stefanyshyn received his B.A. degree in 1966 from the Philadelphia College of Textiles and Science. He enlisted in the Naval Reserve in May 1966 and then joined the regular Navy in October 1966. His duty stations included the Navy Preventive Medicine Unit No. 6, Pearl Harbor and Naval Medical School, Naval Hospital, and the Armed Forces Radiobiology Research Institute in Bethesda, MD.

LCDR Stefanyshyn was assigned to the Bureau of Medicine and Surgery, Washington, DC, at the time of his death.

NAVY GRADUATE MEDICAL EDUCATION

SAC XI has completed deliberations for over 630 applicants for Navy Graduate Medical Education. The statistical data will be published in a later issue of *U.S. Navy Medicine.*

All medical officers interested in applying for Navy Graduate Medical Education training beginning July 1981 should begin their application process as soon as possible to prevent unnecessary delays in administrative procedures.

BUMEDINST 1520.10G dated May 1976 presents proper application procedure.

Those who have previously applied for training and have information on file at the Bureau of Medicine and Surgery may state this in their application. (Dean's letter, transcript, etc.) under item 3.

It is anticipated that all medical officers in operational assignments will receive BUMED Notice 1520 announcing Graduate Medical Education availability by 1 May 1980; however, if information is presently available to you, an early application is encouraged. The deadline for application will be 15 Aug 1980. Applications received after this date will be difficult to complete in time for the Specialty Advisory Committee which will convene in September 1980.

Information on Navy GME for 1981 may be obtained by writing to: Commanding Officer, Naval Health Sciences Education and Training Command, Attn: Code 4, National Naval Medical Center, Bethesda, MD 20014. Telephone: Autovon 295-0648, Commercial (202) 295-0624.

EMERGENCY MEDICINE

The Government Services Chapter of the American College of Emergency Physicians (ACEP) now has over 90 members and about 40 percent of these are Navy physicians. The Chapter is the voice of government employed physicians specializing or interested in emergency medicine, and is primarily comprised of military physicians. Physicians who are ACEP members and employed by the government are eligible to join. Its members are dedicated to upgrading emergency care and awareness of emergency medical systems at government medical facilities, and also increasing interservice communication and cooperation in the emergency medical aspects of operational military medicine. This is especially important as emergency medicine is the newest specialty to be approved by the AMA, and has stringent board exam eligiblility requirements. In addition, there are billets in emergency medicine identified in each of the military services, outservice training fellowships granted, and the Army has three functioning residency programs in emergency medicine.

The annual meeting will be 15-18 Sept 1980 in Las Vegas, NV. An additional mid-year scientific symposium is being planned for early 1981.

For further information concerning the Government Services Chapter of ACEP, contact: CDR Robert P. Banka, MC, USN, 303-E Nimitz Drive, San Francisco, CA 94130, Telephone: (415) 397-1605.

MSC OFFICER ORIENTATION AND INDOCTRINATION TRAINING

In May 1980, Medical Service Corps officer orientation and indoctrination training moved from the Naval School of Health Sciences (NSHS), Bethesda, MD, to the Naval Officer Indoctrination School, Navy Education and Training Center, Newport, RI. Before 1965, this type of training was conducted at the Officers Candidate School, Newport, RI. Similar military training for aerospace sciences specialty officers will continue to be conducted through the Naval Aviation

Schools Command, Pensacola, FL, as a component of their six-month curriculum at the Naval Aerospace Medical Institute. This recent realignment of training will enable NSHS to focus on other newly added junior, middle, and senior grade Medical Department officer development training programs.

INFECTIOUS DISEASE PROGRAM

The Naval Medical Research Unit No. 3 in Cairo, Egypt, has established a training program in infectious and parasitic diseases. First consideration is given to medical students with a service obligation and to active-duty physicians.

Persons applying should expect to spend from one to two months in Cairo working with physicians and scientists at NAMRU-3 and nearby hospitals. They will see patients with meningitis, brucellosis, typhoid fever, tuberculosis, and serious parasitic diseases including bilharziasis.

Both students and house officers can count the time as an elective in infectious disease. Officers will need either TAD or authorization orders. Housing for unaccompanied personnel is available on a limited basis.

Because of mail time and the need for planning, passports, visas, and immunization, a minimum of four months should be allowed between the inquiry and the requested period of attendance.

Inquiries should be submitted to CAPT John J. Dempsey, MC, USN, NAMRU-3, FPO New York 09527.

AMERICAN BOARD CERTIFICATIONS

(Subspecialties are indicated in parenthesis)

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